



U.S. Department
of Transportation

**Pipeline and
Hazardous
Materials Safety
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

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DOT-E 13583
(SECOND REVISION)

EXPIRATION DATE: October 31, 2006

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Structural Composites Industries (SCI)
Pomona, CA
2. PURPOSE AND LIMITATION:
 - a. This exemption authorizes the manufacture, marking, sale and use of non-DOT specification composite cylinders conforming with all requirements of the DOT-CFFC (BASIC REQUIREMENTS FOR FULLY WRAPPED CARBON-FIBER REINFORCED ALUMINUM LINER) specification cylinder and as specified herein, for the transportation in commerce of the materials authorized by this exemption. This exemption provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein.
 - b. The safety analyses performed in development of this exemption only considered the hazards and risks associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 173.302a(a)(1), 173.304a(a)(1), 175.3 and 180.205, in that a non-DOT specification cylinder is not authorized, except as specified herein.
5. BASIS: This exemption is based on the application of SCI dated May 6, 2004 and supplementary information dated October 18 and 29, 2004 submitted in accordance with § 107.105 and the public proceeding thereon. Additional information dated December 6, 2004 was also submitted.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

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Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Packing Group
Air compressed (containing up to 39% by volume oxygen)	2.2	UN1002	N/A
Argon, compressed	2.2	UN1006	N/A
Carbon dioxide	2.2	UN1013	N/A
Helium, compressed	2.2	UN1046	N/A
Hydrogen, compressed	2.1	UN1049	N/A
Methane, compressed or Natural gas, compressed (with high methane content)	2.1	UN1971	N/A
Neon, compressed	2.2	UN1065	N/A
Nitrogen, compressed	2.2	UN1066	N/A
Nitrous oxide, compressed	2.2	UN1070	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification composite cylinder as described in SCI application on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA). The cylinder must meet all the requirements of the ISO Standard 11119-2: 2002 (Gas Cylinders of Composite Construction- Specification and Test Methods - Part 2) for unlimited service life. Additionally, the cylinder must meet the following:

(1) The ratio of burst pressure (P_b) over service pressure (P_s) must be greater than or equal to 3.4 ($P_b/P_s = 3.4$).

(2) All of the batch inspection and testing must be performed for unlimited service life (e.g. hydraulic pressure test will be 12,000 cycles with test pressure).

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(3) The liner is aluminum alloy 6061-T6 and made in accordance with the DOT-CFFC-6 specification.

(4) Service pressure may not exceed 345 bar (5000 psi).

(5) Water volume may not exceed 90 liters (200 lb).

(6) Each cylinder must be fitted with a pressure relief device in accordance with § 173.301(f).

(7) Cylinder valve protection must be in accordance with § 173.301(g).

(8) Cylinder test pressure is 3/2 of the marked service pressure.

b. MARKING: Each cylinder must be marked as prescribed in the DOT standard for BASIC REQUIREMENTS FOR FULLY WRAPPED CARBON FIBER REINFORCED ALUMINUM LINED CYLINDERS (DOT -CFFC), Section CFFC-14.

c. TESTING - Cylinders must be retested at least once every five years. Testing must be performed in accordance with § 180.205, having a test pressure of 3/2 of the marked service pressure, and the latest edition of CGA pamphlet C-6.2 "Guidelines for Visual Inspection and Re-qualification of Fiber Reinforced High Pressure Cylinders", except as specifically noted herein:

(1) Cylinders must be volumetrically tested by the water jacket method suitable for the determination of the cylinder expansion for a minimum test time at settled test pressure for one minute.

(2) A maximum permanent expansion to total expansion ratio does not apply. The cylinder must be condemned if the elastic expansion exceeds the rejection elastic expansion (REE) as marked on the cylinder.

(3) Retest markings must be applied on a label securely affixed to the cylinder and overcoated with epoxy, near the original test date. Metal stamping of the composite surface is prohibited. Reheat treatment of rejected cylinders is not authorized.

(4) Cylinders with fiber damage (cuts, abrasions, etc.) that exceed Level 1 type damage as defined in CGA Pamphlet C-6.2 and meet the following depth and length criteria are considered to have Level 2 damage:

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a. Depth - Damage that upon visual inspection is seen to penetrate the outer fiberglass layer but does not expose the carbon layer beneath, or that has a measured depth of greater than 0.005 inches and less than 0.045 inches for cylinders with an outside diameter greater than 7.5 inches or less than 0.035 inches for cylinders 7.5 inches or less in outside diameter;

b. Length - Damage that has a maximum allowable length of:

Region	Direction of fiber damage	Maximum length of damage
Cylinder sidewall and domes	Transverse to fiber direction (longitudinal direction)	20% of the length of the straight sidewall section of the cylinder
Cylinder sidewall and domes	In the direction of the fiber (circumferential direction)	20% of the length of the straight sidewall section of the cylinder

(5) Cylinders with damage that meet the Level 2 criteria must be rejected. Retesters must contact the cylinder manufacturer (grantee) in the event that damage is questionable based on this criteria. Repair of rejected cylinders is authorized for Level 2 type damage. Repairs must be made in accordance with CGA pamphlet C-6.2, prior to the hydrostatic pressure test. Repairs must be evaluated after the hydrostatic test.

(6) Cylinders that have direct fiber damage that penetrates through the outer fiberglass layer and into the carbon layer, or that have a measured damage depth of greater than the Level 2 maximum stated in (5)(a) above are considered to have Level 3 type damage. Cylinders that have damage with depth meeting Level 2, but length exceeding the Level 2 maximum are considered to have Level 3 type damage. Cylinders with Level 3 type damage are not authorized to be repaired, and must be condemned.

(7) A hydrostatic retest may be repeated as provided for in § 180.205(g), only two such retests are permitted. Pressurization prior to the official

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hydrostatic test for the purpose of a systems check may not exceed 85% of the minimum required test pressure.

d. OPERATIONAL CONTROLS -

(1) Cylinders manufactured under this exemption are not authorized for use thirty (30) years after the date of manufacture.

(2) Cylinders may not be used for underwater breathing purposes.

(3) Cylinders used in nitrous oxide service must conform with § 173.304a(a)(1).

(4) A cylinder that has been subjected to fire may not be returned to service.

(5) Transportation of flammable gases is not authorized aboard passenger-carrying aircraft or cargo vessel.

(6) Cylinders must be packaged in accordance with § 173.301(a)(9).

8. SPECIAL PROVISIONS:

a. The following recall tests only apply to the cylinder lots and designs manufactured during the initial year of production under this exemption. The grantee must randomly recall a minimum of thirty (30) cylinders for each design type that have been in service for 10 years and additionally for 15 years. All recalled cylinders must be tested in accordance with the prototype test procedures described in section 8.2 of ISO 11119-2:2002 for 30 years service life except the burst pressure, p_b , must be not less than 1.8 times the test pressure, p_h , and y must be equal or greater than 20 years in sections 8.5. The complete test report including original test data must be submitted to the Associate Administrator for Hazardous Materials Safety for assessment within 30 days of completion. If any cylinder design fails a recall prototype test as prescribed above, the service life for that cylinder design is restricted to a maximum of 15 years unless authorized by the Associate Administrator for Hazardous Materials Safety.

b. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this exemption for the transportation of the hazardous materials

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specified in paragraph 6, only in conformance with the terms of this exemption.

c. A person who is not a holder of this exemption, but receives a package covered by this exemption, may reoffer it for transportation provided no modification or change is made to the package or its contents and it is offered for transportation in conformance with this exemption and the HMR.

d. A current copy of this exemption must be maintained at each facility where the package is offered or reoffered for transportation.

e. A current copy of this exemption must be maintained at each facility where the package is manufactured under this exemption and must be made available to a DOT representative upon request.

f. Each packaging manufactured under the authority of this exemption must be either (1) marked with the name of the manufacturer and location (city and state) of the facility at which it is manufactured or (2) marked with a registration symbol designated for a specific manufacturing facility by the Office of Hazardous Materials Exemptions and Approvals for a specific manufacturing facility.

g. The cylinders described in this exemption are authorized only for normal transportation as an article of commerce i.e., the movement of hazardous materials packages from consignor to consignee.

h. When authorized for transportation by cargo vessel as prescribed in § 172.101, Hazardous Materials Table, flammable gases covered by this exemption must be packed within a closed freight container of steel construction.

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo vessel, passenger-carrying aircraft, and cargo only aircraft.

10. MODAL REQUIREMENTS:

a. A current copy of this exemption must be carried aboard each cargo vessel or aircraft used to transport packages covered by this exemption.

b. The shipper must furnish a current copy of this exemption to the air carrier before or at the time the shipment is tendered.

11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

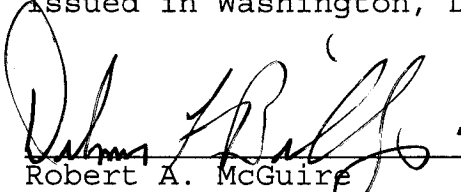
- o All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
- o Persons operating under the terms of this exemption must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
- o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this exemption must receive training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this exemption, including display of its number, when this exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this exemption are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 - Immediate notice of certain hazardous materials incidents, and 171.16 - Detailed hazardous materials incident reports. In addition, the grantee(s) of this exemption must notify the Associate Administrator for Hazardous Materials Safety -- OHMEA, in writing, of any incident involving a package, shipment or operation conducted under terms of this exemption.

Issued in Washington, D.C.:


Robert A. McGuire
for Associate Administrator for
Hazardous Materials Safety

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DATE

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Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Washington, D.C. 20590. Attention: DHM-31.

Copies of this exemption may be obtained by accessing the Hazardous Materials Safety Homepage at <http://hazmat.dot.gov/exemptions> Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

PO: MT/AM